after the latter period always to the left, after a given hour of day During the early sun, however, they were to the *right-hand*, and as the sun approached a given altitude, they were invariably to the *left-hand*. Deflections observed during the summer season were also to the *left-hand*; but those of the early sun were not submitted to the test.

On testing the instrument with a voltaic pair, it was shown that the current passed from south to north *above the needle* with the *early sun*, or when the indicator deflected to the right-hand, and *beneath the needle* with the rays which proceeded from a *considerable elevation*, or when the needle deflected to the left-hand.

In conclusion, the author states that the results of these experiments evince to his mind more than ever the *unity of force*; and that experimental evidence appears to justify the conclusion at which he has long since arrived, *that there is one, only, universal force in nature, which is modified by the accidental and varied conditions to which it is subjected, but that its essential nature and characteristics are at all times unchangeably the same.*

11. "On the Mean Temperature of the Observatory at Highfield House, near Nottingham, from the year 1810 to 1850." By Edward Joseph Lowe, Esq., F.R.A.S. Communicated by Marshall Hall, M.D., F.R.S. Received May 3, 1851.

The object of the author in this communication is to connect the series of thermometrical observations made by the late Matthew Needham, Esq., at Lenton House, at the distance of only 200 yards from the observatory of Highfield House, with those made by himself from 1842 to the present time at the latter place. He procured Mr. Needham's observations from the Committee of the Bromley House Library, Nottingham, and also the instrument with which they were made, and which, upon comparison with his own standard, was found by Mr. Glaisher to be correct.

Mr. Needham's observations were registered at 8 A.M. and 11 P.M., and to the monthly means of these records corrections have been applied to convert them into mean monthly values. Those made by the author were registered at 9 A.M. and 9 P.M., and these, together with the highest and lowest readings of self-registering thermometers, have been subjected to the same process.

The following tables deduced from the observations are given in the paper:—

1. The mean temperature of each month at Highfield House from 1810 to 1850.

From this table are deduced the mean temperature of each month from all the observations, viz.

January 36°·2; February 38°·9; March 42°·4; April 47°·6; May 53°·6; June 58°·7; July 61°·1; August 60°·2; September 56°·6; October 50°·0; November 42°·9; December 39°·1.

2. The highest and lowest monthly mean temperature in every year, from 1810 to 1850, with the amount of difference of temperature.

From this table it appears that the coldest month in the year has occurred in January 22 times; in February 10 times; in March once; and in December 8 times.

The hottest month in the year has occurred in June 5 times; in July 26 times; in August 12 times; and in September once.

The coldest month in the whole period occurred in January 1814, the mean temperature being 26°·8.

The hottest month during the whole period occurred in July 1847, the mean temperature being 68°·8.

The means of all the differences between the hottest and coldest month in every year is 27°·2: the least difference occurred in 1828, viz. 21°·3; the greatest difference in 1814, viz. 35°·0.

3. The excess of the monthly mean temperature in every year, above the temperature of the month from all the years.

The means of the numbers in each column of this table, taken without regard to sign, gives the variability of the temperature in spring 2°·1; in summer 1°·7; in autumn 2°·0; in winter 3°·0.

The greatest difference in the monthly means in spring is 11°·9; in summer 12°·5; in autumn 13°·9; in winter 18°·3.

The coldest year in this series was 1814, when the mean annual temperature was only 45°·0: the hottest year was 1846, the mean annual temperature being 51°·4.

4. The mean temperature in every month in successive groups of 10 years, and for the whole year.

5. The mean temperature in quarterly periods in successive groups of 10 years.

From this it is stated that the mean temperature of the 1st quarter is 39°·5; of the 2nd, 53°·3; of the 3rd, 59°·3; of the 4th, 44°·0.

6. The mean temperature in spring, summer, autumn and winter, in successive groups of 10 years.

From this it is concluded that the mean temperature of spring is 47°·8; of summer 60°·0; of autumn 49°·9; of winter 38°1.

Cold springs occurred in 1810, 12, 14, 16, 17, 37, 38, 39, 42, 45, 49 and 50; and the mean of the temperatures of these springs is 45°·5. The coldest spring was that of 1837, the mean temperature being only 43°·3.

Hot springs occurred in 1811, 15, 19, 22, 23, 27, 28, 30, 31 and 41; and the mean of the temperatures of these springs is 50°·4: the hottest spring was that of 1841, the mean temperature being as high as 51°·4.

Cold summers occurred in 1816, 17, 21, 23, 41, 43 and 49; and the mean of the temperatures of these summers is 58°·0. The coldest summer was that of 1816, the mean temperature being only 57°·3.

Hot summers occurred in the years 1818, 24, 26, 31, 46 and 47; and the mean of the temperatures of these summers is 64°·0. The hottest summer was that of 1846, the mean temperature being as high as 65°·0.

Cold autumns occurred in the years 1814, 16, 20, 29, 36, 37, 38, 42, 44, 45, 49 and 50; and the mean of the temperatures of these autumns is 47°·8. The coldest autumn was that of 1849, the mean temperature being only 47°·0.

Hot autumns occurred in the years 1810, 11, 18, 21, 27, 28, 40 and 46; and the mean of the temperatures of these autumns is 52°·3. The hottest autumn was that of 1818, the mean temperature being as high as 54°·5.

Cold winters occurred in 1814, 16, 20, 23, 30, 38, 41, 45 and 47; and the mean of the temperatures of these winters is 34°·4. The coldest winter was that of 1814, the mean temperature being only 32°·7.

Hot winters occurred in 1822, 24, 28, 34, 35, 46, 48 and 49; and the mean of the temperatures of these winters is 41°·5. The hottest winter was that of 1834, the mean temperature being 43°·3.

12. "On Depressions of the Wet-bulb Thermometer during the Hot Season at Ahmednuggur, in the Deccan." By Colonel Sykes, F.R.S. &c. Received June 17, 1851.

The author states that he is indebted to Major William Coghlan for the tables of hourly depressions of the wet-bulb thermometer during the months of March and April of the present year, which form the subject of this communication, and which are a necessary supplement to his paper recently published in the Philosophical Transactions. The observations at Ahmednuggur, lat. 19° 05′ 49″ N., long. 74° 48′ 10″, elevation above the sea 1911 feet, which were undertaken by Dr. Forbes Watson, commenced on the 18th of March, and were continued to the 14th of April inclusive. They were made hourly from 6 A.M. to 9 P.M., giving 16 hourly records daily; but on the 24th and 29th of March, and on the 4th, 8th and 10th of April, they were continued throughout the twenty-four hours. The instruments employed were a dry- and a wet-bulb thermometer, by Adie, perfectly alike and giving precisely the same indications when both were dry, and a self-registering thermometer. They were suspended on a platform attached to a window under the verandah of the house, with a N.W. exposure, and were protected from radiation and reflexion of heat from the ground. As, from some preliminary observations, it appeared that the depression of the wet-bulb varied in every case with the intensity and duration of the draught of air upon it, in each observation a slight current of air was produced by a fan near the mouth of a funnel, the small end of which abutted on the wet-bulb, and the operation was continued until no further depression of the thermometer could thus be produced; a stronger current of air was then forced on the bulb by means of a large double bellows; and the result of each operation was recorded.

To obviate the anomalies which might arise from single observations, and to fix a mean state, for each hour, of the temperature of the air, the temperature of evaporation, and the mean depression of the wet-bulb, the means of these elements have been taken and are presented in a table. In this table are also given the dew-points as determined by means of Mr. Glaisher's factors and by Dr. Apjohn's